

## **Tool Including Bit and Handle**

### **Cross-Reference**

The present application is a continuation-in-part application of US Patent Application No. 10/271274 filed on October 16, 2002.

### **Field of Invention**

The present invention relates to a tool including a bit and a handle for releasable engagement with the bit.

### **Background of Invention**

In US Patent No. 5934384, a shaft 1, a stop 2, a C-clip 3, a spring 4, a ring 5, a chuck 6, a magnet 7 and a bit 8 are disclosed (Figure 2). The shaft 1 includes a polygonal hole 10 in an end, an annular groove 11 in the periphery, an aperture 110 communicating the polygonal hole 10 with the annular groove 11, an annular groove 12 in the periphery and a polygonal rod 13 at an opposite end. The stop 2 includes a rod 20 extending from a central portion. The stop 2 is put in the annular groove 11 so that the rod 20 can be inserted into the polygonal hole 10 through the aperture 110. The C-clip 3 is put in the annular groove 12. The magnet 7 is fit in the polygonal hole 10. The chuck 6 includes a tapered orifice 61. The chuck 6 is put around the shaft 1. The spring 4 is put around the shaft 1 and in the chuck 6. The ring 5 is put around the shaft 1 and fit in the chuck 6. Thus, the chuck 6 is kept around the shaft 1. Due to the spring 4 compressed between the C-clip 3 and the ring 5, the chuck 6 is biased in a direction so that the tapered orifice 61 pushes the stop 2 so as

1 to insert the rod 20 into the polygonal hole 10 (Figure 4). The bit 8  
2 includes a polygonal shank 80 that includes several corners 81 each  
3 defining a cut 82. The chuck 6 can be moved in an opposite direction so  
4 that the tapered orifice 61 releases the stop 2 so as to allow the rod 20 to  
5 leave the polygonal hole 10 (Figure 6). Thus, the bit 8 can be inserted in  
6 the polygonal hole 10. The chuck 6 can be released so that the rod 20 is  
7 inserted into one of the cuts 82. Thus, the bit 8 is kept on the shaft 1.  
8 The rod 20 is however inadequate to keep the bit 8 on the shaft 1. When  
9 this happens during operation, the bit 8 might cause human casualty.

10

11 There have been devised various hand tools that each include a bit  
12 engaged with a handle in a releasable manner. Generally, such a bit  
13 includes an insert, and such a handle includes a socket for receiving the  
14 insert. A locking device is used to lock the insert in the socket.

15

## 16 **Summary of Invention**

17 It is an objective of the present invention to provide a tool including a bit  
18 and a handle engaged with the bit in a releasable manner.

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20 According to the present invention, a handle is provided for use with a bit  
21 or extensive rod. The handle includes a socket. The socket includes a  
22 thin section, a thick section, an annular face between the thin and thick  
23 sections, an axial cavity and a radial aperture communicated with the  
24 axial cavity in the thin section. A detent is put in the radial aperture. A  
25 chuck is put on the socket for control over the detent.

26

1 Other objects, advantages, and novel features of the invention will  
2 become more apparent from the following detailed description when  
3 taken in conjunction with the attached drawings.

#### 4 5 **Brief Description of Drawings**

6 The present invention will be described through detailed illustration of  
7 embodiments referring to the drawings.

8  
9 Figure 1 is a perspective view of a handle for releasable engagement with  
10 a bit according to a first embodiment of the present invention.

11  
12 Figure 2 is an exploded view of the handle shown in Figure 1.

13  
14 Figure 3 is a perspective partial view of the handle shown in Figure 2.

15  
16 Figure 4 is a perspective view of a bit to be engaged with the handle  
17 shown in Figure 3.

18  
19 Figure 5 is a cutaway view of the bit shown in Figure 4 engaged with the  
20 handle shown in Figure 2.

21  
22 Figure 6 is similar to Figure 5 but shows the bit in a different position  
23 with respect to the handle.

24  
25 Figure 7 is a cross-sectional view taken along a line 7-7 in Figure 5.

1 Figure 8 is a cross-sectional view taken along a line 8-8 in Figure 5.

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3 Figure 9 is another cutaway view of the bit and the handle in Figure 6.

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5 Figure 10 is an exploded view of a handle according to a second  
6 embodiment of the present invention.

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8 Figure 11 is a cross-sectional view of the handle shown in Figure 10.

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#### 10 **Detailed Description of Embodiments**

11 Figure 1 shows a handle 10 according to a first embodiment of the  
12 present invention. The handle 10 can be engaged with a bit 30 (Figure 4)  
13 in a releasable manner to be described.

14

15 Referring to Figure 2, the handle 10 includes a socket 32, a grip 12  
16 extending from the socket 32 and a chuck 20 put around the socket 32.

17

18 The periphery of the socket 32 includes a thin section 34 and a thick  
19 section 36 so as to form an annular face 38 between the thin section 34  
20 and the thick section 36. The socket 32 includes an annular groove 13  
21 defined in the thin portion 34, an axial cavity 11 defined therein an end, a  
22 radial aperture 14 communicated with the axial cavity 11 in the thin  
23 section 34, a radial cavity 17 communicated with the axial cavity 11 in  
24 the thick section 36, a radial aperture 18 communicated with the axial  
25 cavity 11 opposite to the radial cavity 17, a longitudinal cavity 42 defined  
26 in the annular face 38 and communicated with the radial cavity 17 and a

1 longitudinal cavity 44 defined in the annular face 38.

2

3 A detent 15, in the form of a ball, is put in the radial aperture 14. A  
4 detent 19, in the form of a ball, is put in the radial cavity 17 through the  
5 radial aperture 18.

6

7 The chuck 20 includes a check device 24, a control device 23, an  
8 operative ring 22 and an instructive ring 21.

9

10 The check device 24 includes a spring 46 and a detent 48 in the form of a  
11 pin. The spring 46 and the detent 48 are both put in the longitudinal  
12 cavity 44.

13

14 The control device 23 includes a spring 26 and a rod 28 both put in the  
15 longitudinal cavity 42 for control over the detent 19. Biased via the  
16 spring 26, the rod 28 is movable in the longitudinal cavity 42. The rod  
17 28 defines a recess 29 for receiving the detent 19.

18

19 To lock and release the bit 30, the operative ring 22 is used to control the  
20 detent 15 directly and the detent 19 through the control device 23. The  
21 operative ring 22 includes a groove 52 defined in an internal face in order  
22 to receive a portion of the detent 15. The groove 52 gets deeper from a  
23 first end to a second end. The operative ring 22 includes a recess 54  
24 defined in an edge or end in order to receive an end of the rod 28. The  
25 recess 54 gets shallower from a first end to a second end. The operative  
26 ring 22 includes a recess 56 defined in the edge or end in order to receive

1 an end of the detent 48.

2

3 On the instructive ring 21 is provided an instruction regarding directions  
4 in which the chuck 20 should rotated in order to lock and release the bit  
5 30. The instructive ring 21 is put around the operative ring 22. The  
6 operative ring 22 is put around the thin section 38 of the socket 32 in a  
7 rotational manner. The groove 52 receives a portion of the detent 15.  
8 The recess 54 receives a portion of the detent 19. A C-clip 58 is fit in  
9 the annular groove 13 in order to keep the chuck 20 on the socket 32.

10

11 The operative ring 22 can be rotated between a locking position shown in  
12 Figure 3 and a releasing position shown in Figure 4.

13

14 Referring to Figures 4, 5 and 7, in the releasing position, the detent 15 is  
15 put at the second end of the groove 52 so that it stays completely off the  
16 axial cavity 11. The rod 23 is put at the second end of the recess 54.  
17 Hence, the detent 19 is located at the deepest portion of the recess 29 so  
18 that it stays completely off the axial cavity 11. Therefore, the bit 30 can  
19 be inserted into the axial cavity 11.

20

21 Referring to Figures 3, 6 and 8, in the locking position, the detent 15 is  
22 put at the first end of the groove 52 so that it enters partially in an annular  
23 groove defined in the bit 30 in the axial cavity 11. The rod 23 is put at  
24 the second end of the recess 54. Hence, the detent 19 is located at a  
25 shallow portion of the recess 29 so that it enters partially in another  
26 annular groove defined in the bit 30 in the axial cavity 11. Therefore, a

1 portion of the bit 30 is locked in the axial cavity 11.

2

3 Referring to Figure 9, in the locking position, the detent 48 is put in the  
4 recess 56 so as to keep the chuck 20 in the locking position. With the  
5 insertion of the detent 48 in the recess 56, it is ensured that the chuck 20  
6 stays in the locking position in operation of the handle 10 and the bit 30.

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8 Figures 10 and 11 show a handle 40 according to a second embodiment of  
9 the present invention. The handle 40 is identical to the handle 10 except  
10 for three things. Firstly, the handle 40 excludes the grip 12. Secondly,  
11 the handle 40 includes an axial cavity 41 longer than the axial cavity 11.  
12 Thus, the handle 40 can receive a long extensive shaft 50 instead of the  
13 bit 30. Finally, the handle 40 includes another axial cavity 60 opposite  
14 to the axial cavity 41. The axial cavity 60 enables the handle 40 to  
15 engage with a driving device (not shown).

16

17 The present invention has been described via detailed illustration of two  
18 embodiments. Those skilled in the art can derive variations from these  
19 embodiments without departing from the scope of the present invention.  
20 Therefore, these embodiments shall not limit the scope of the present  
21 invention defined in the claims.